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Title: Overview of the Process Automation and Control Group (E-3)

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Semanision, Scott David
Bittner, Dustin L.

Intended for: Recruit Students for internships, have presentation that gives overview of group for other meetings

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Overview of the Process Automation and Control Group (E-3)

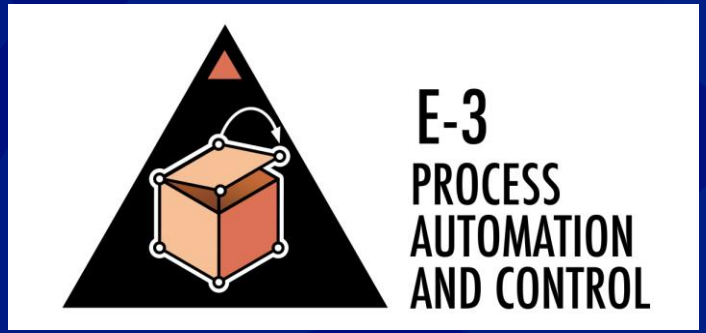
Beth Boardman, Scott Semanision, Dustin Bittner

Group Leader: Manny Tafoya
Office Administrator: Morgan Rosandich

Process Automation and Control (E-3)

- Part of Weapons Associate Laboratory Directorate (DDW)
  - Weapons Engineering Directorate (WE)
    - Engineering Technology and Design (E) Division

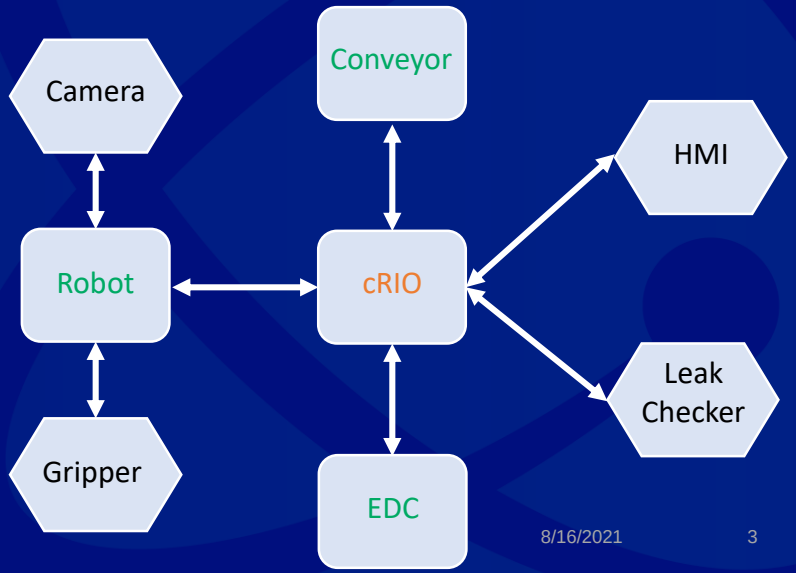
- 3 Teams:
  - Fabrication and Assembly
    - FLM: Candie Martinez; Alternate FLM: Dustin Bittner
  - Process Controls
    - FLM: Scott Semanision; Alternate FLM: Justin Sandoval
  - Automation and Robotics
    - FLM: Bryan Steinfeld; Alternate FLM: Beth Boardman

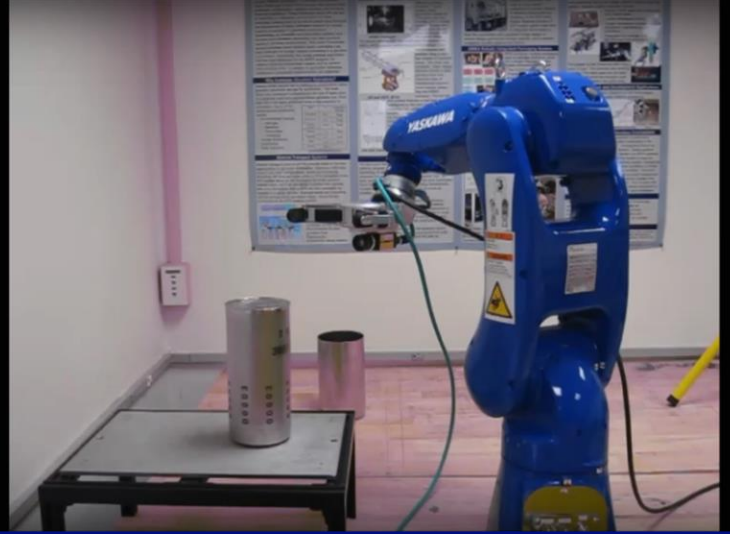


Automation and Robotics

- Main Disciplines:
  - Mechanical Design and Analysis: CAD
  - Software Development: LabVIEW, Python, C++
  - Robotics: Programming (ROS, Proprietary Robot Languages), Vision,

- Process Design and System Integration
- Hazardous Material Handling

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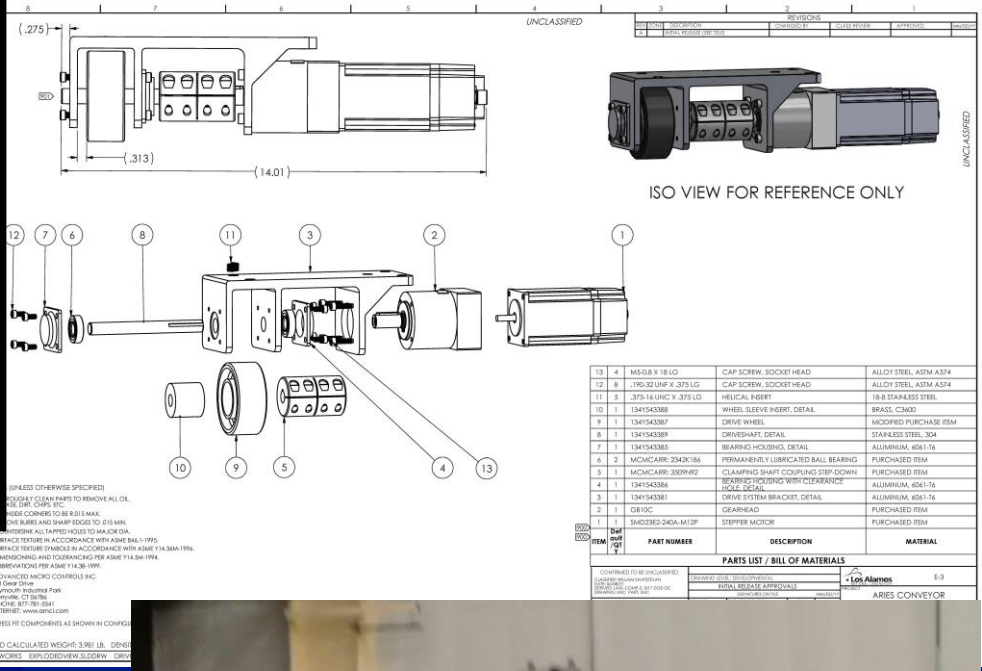
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PARTS LIST / BILL OF MATERIALS
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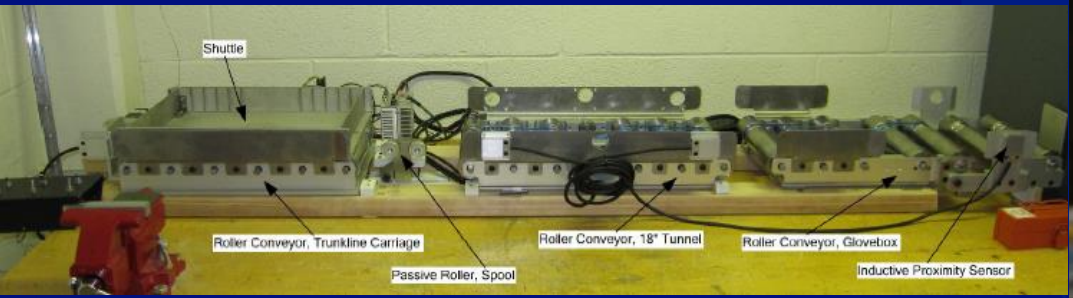
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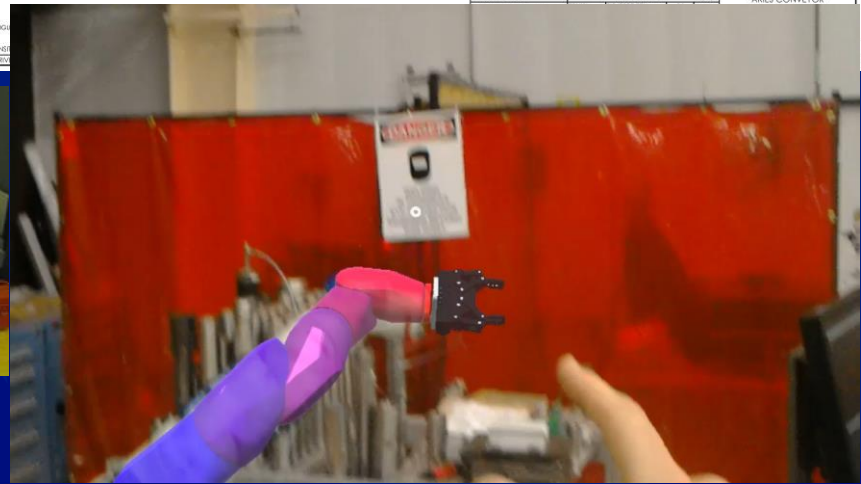
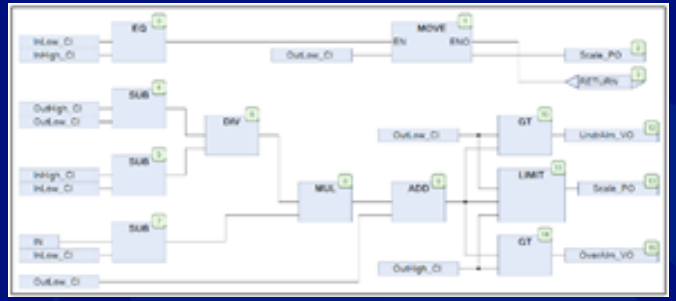
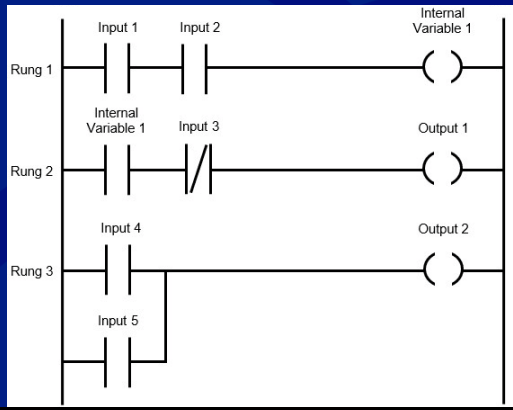
Roller Conveyor, Trunkline Carriage
Passive Roller, Spool
Roller Conveyor, 18° Tunnel
Roller Conveyor, Glovebox
Inductive Proximity Sensor



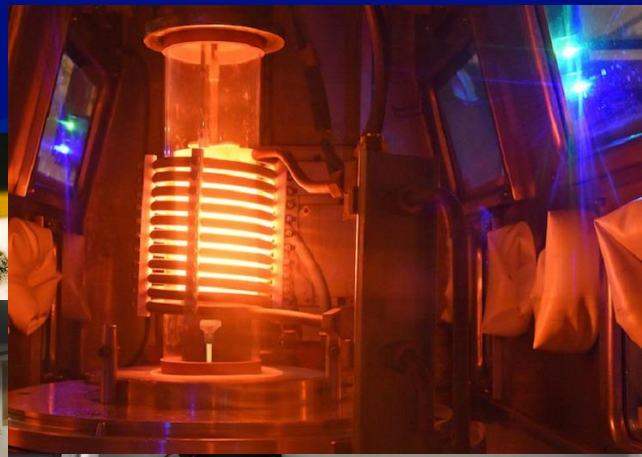
Process Controls

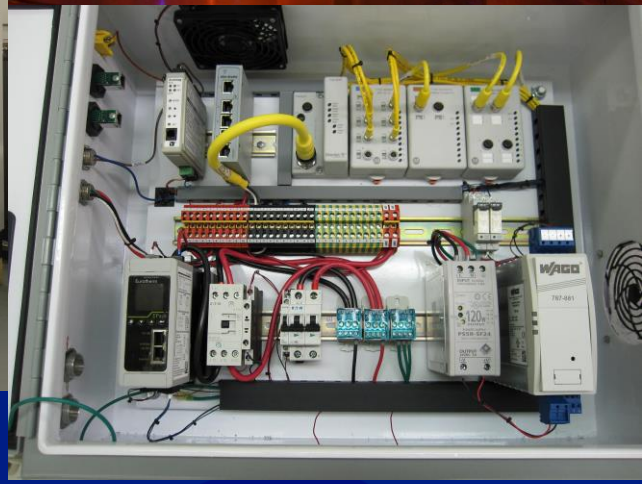
- Main Disciplines:
  - Programmable Logic Controllers (PLC)
    - Programming
      - Ladder Logic, Function Block, Structured Text
    - Hardware
      - Sensors – temperature, pressure, flow, force
      - Actuators – valves, motors, lights, pumps
  - Human Machine Interfaces (HMI)
    - Touch screens
    - PC based
  - System Integration for Process Control
    - Metallurgy, hydraulics, water, chemicals, resistive and inductive heating





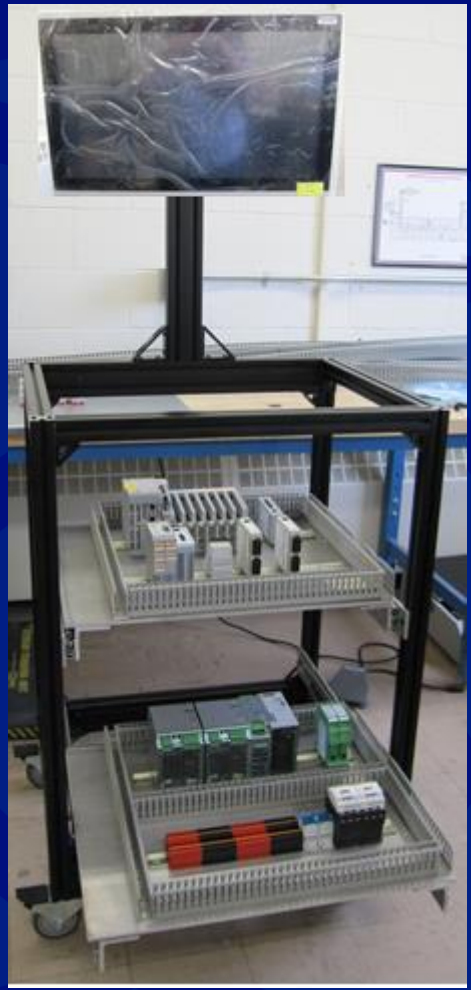
Process Controls





Fabrication and Assembly

- Fabricate electrical, mechanical, and robotic systems
- Create electrical drawings
- Build cables
- Control rack assembly
- Test and troubleshoot electrical and electronic systems
  - Digital Multimeter (DMM)
  - Oscilloscope
- Use of shop tools: soldering iron, crimpers, drills, punches



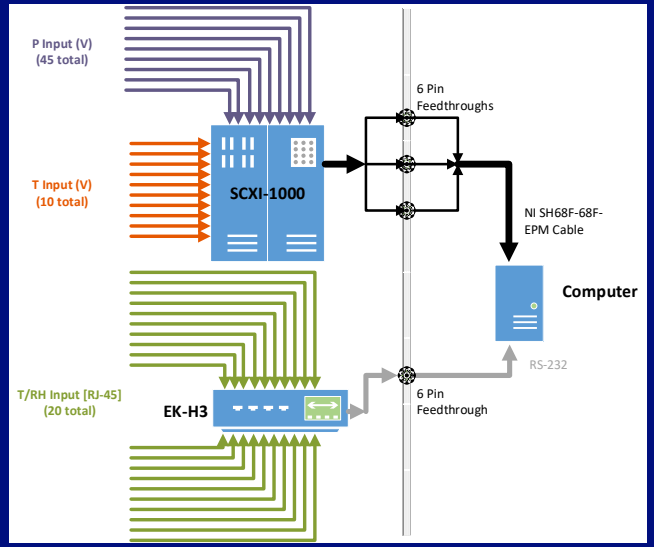


Figure 4: Mini Model ISO

Figure 5: Mini Assembly ISO

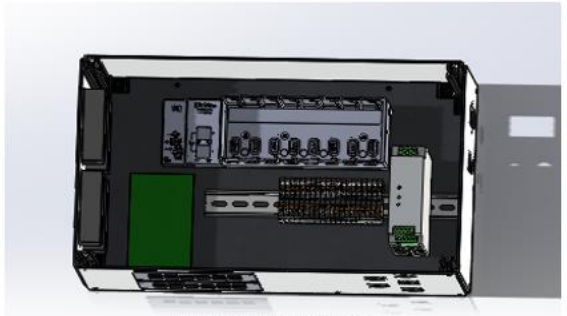


Figure 6: Mini Model Top

Figure 7: Mini Assembly Top

In-Person Internship

- Less than 50% time for the year
  - A few hours a week during school year
  - Full-time during the summer/breaks
- Start by working in lab space with technicians
  - Assembly of control racks
  - Testing of systems
  - SolidWorks and AutoCad Electrical
- Learn about different engineering disciplines: Electrical, Mechanical, Robotics
- Future:
  - Hire on as technician
  - Transfer to engineering work/mentor within E-3 or other LANL groups
    - Hire on as engineer

The Process Automation and Controls (E-3) group is looking for year-round undergraduate interns to help with our R&D engineering efforts. E-3 is a full support mechanical, electrical, and process controls engineering services group that provides design, fabrication, testing, installation, and specialized processing systems in nuclear and non-nuclear applications. With E-3's wide range of capabilities, including robotics, electrical-mechanical hardware and software design and engineering, electrical drafting, project management, systems development and integration, we can help you narrow your engineering focus onto what you enjoy most. The group is comprised of engineers, scientists, development and fabrication technicians and technologists.

This Engineering Undergraduate Student (UGS) Program offers paid year-round internships for undergraduate engineering and applied-sciences students. We will provide mentoring, hands-on technical experience, and professional development opportunities through a formalized work plan complementing the student's chosen area of study.

Examples of E-3 projects in Engineering include, but are not limited to:

Design and assembly of control racks;

Perform circuit calculations, including power, current, voltage, frequency, and capacitance;

Developing and following test procedures for electrical equipment and software;

Design, analysis, and testing of mechanical systems and structures;

Design, analysis, and testing of robotic systems;

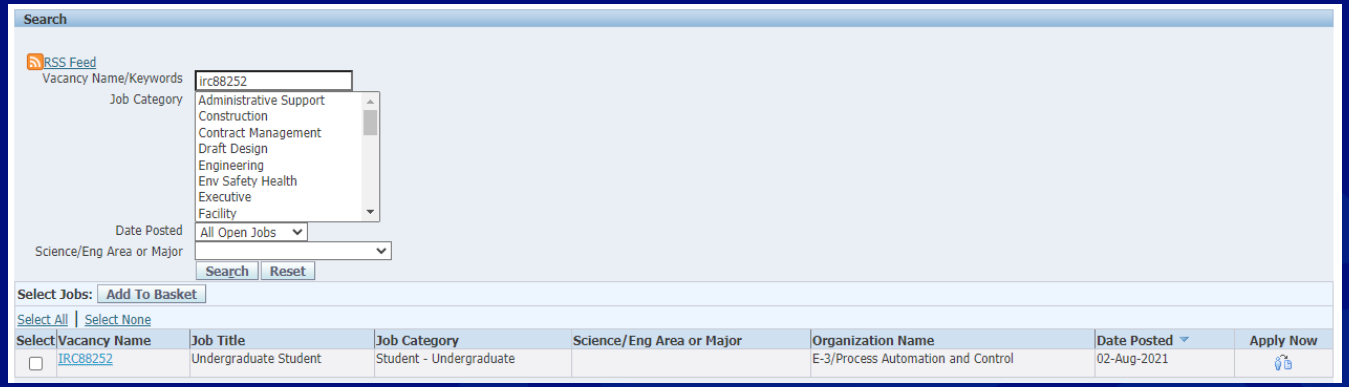
Programming of robotic systems using ROS, python, and C++;

LabVIEW development for supporting control software; and

Using machine learning techniques to improve image processing and mechanical response in robots;

How to Apply

- jobs.lanl.gov
  - IRC88252



- Required Documents:
  - Cover Letter
  - Resume
  - Transcript

Instructions on How to Activate/Create a LANL Jobs Account:

*Follow the instructions below if you have ever had an employee Z number, been a contractor, or received Los Alamos Lab insurance coverage to **activate** your account:*

- Select the ***Click Here*** button if you have **been employed with the Lab or received insurance coverage**.
- Please enter only your first and last name and current email address (an email with your validation code will be sent to you) to activate the account currently in our system.
- Enter your validation code as described in the email you receive and complete the 3-page registration form. Your account is now active and you can apply for jobs or save to your basket. **Important**: Enter the validation code **within 15 days** to activate your account or your account will be deactivated.

*Follow the instructions below if you if you have never been employed with the Lab or received insurance coverage to **create** an account:*

- Select the ***Register*** button if you have **never been employed with the Lab or received insurance coverage** to Create an Account.
- From here, you will establish an account with username and password.

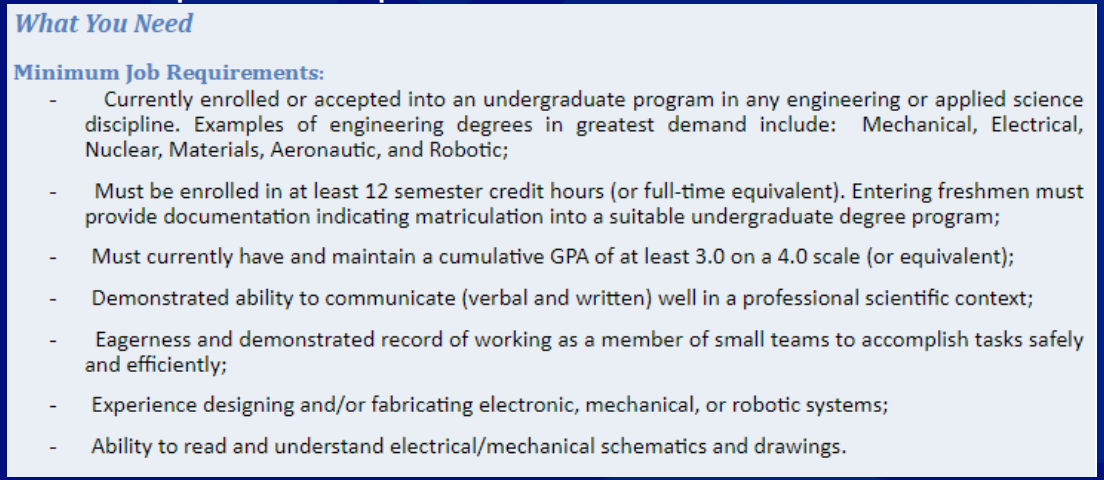
How to Apply: Login to Your Account to Complete the Application Process

- Click the Vacancy Name number (in blue) to view any job's details.
- Click Apply or Add to Basket to apply later. **Tip**: To apply for a job or save your basket, you must have a LANL jobs account.

If you experience any technical issues, please email applyhelp@lanl.gov for assistance.

Cover Letter

- Bullet points for Requirements and Desired Qualifications
  - Respond to each with how you meet that requirement/qualification
- Use school and extracurricular activities to explain how you meet the requirements and desired qualifications
  - Can use the same project for many requirements/qualifications
  - Can use more than one project for one requirement/qualification
- Include current classes and what you hope to learn
- Be explicit: Name of programs, tools, equipment used
- Use the same wording as job ad



What You Need

Minimum Job Requirements:

- Currently enrolled or accepted into an undergraduate program in any engineering or applied science discipline. Examples of engineering degrees in greatest demand include: Mechanical, Electrical, Nuclear, Materials, Aeronautic, and Robotic;
- Must be enrolled in at least 12 semester credit hours (or full-time equivalent). Entering freshmen must provide documentation indicating matriculation into a suitable undergraduate degree program;
- Must currently have and maintain a cumulative GPA of at least 3.0 on a 4.0 scale (or equivalent);
- Demonstrated ability to communicate (verbal and written) well in a professional scientific context;
- Eagerness and demonstrated record of working as a member of small teams to accomplish tasks safely and efficiently;
- Experience designing and/or fabricating electronic, mechanical, or robotic systems;
- Ability to read and understand electrical/mechanical schematics and drawings.

First Last
Street Addy | City | 505-xxx-xxxx | email@email.com

August 3, 2021

Contact Name
Los Alamos National Laboratory
PO Box 1663
Los Alamos, NM

Dear Contact Name,

Ref: IRC88252 Undergraduate Student

Thank you for considering my application for the E-3 Undergraduate Student position. Based on my detailed responses below to the Minimum Job Requires and Desired Qualifications, I feel I am a strong candidate. The Undergraduate Student position would provide me with an opportunity to explore engineering as a career. It would be a pleasure to work with E-3 technicians and engineers.

Minimum Job Requirements:

Currently enrolled or accepted into an undergraduate program in any engineering or applied science discipline. Examples of engineering degrees in greatest demand include: Mechanical, Electrical, Nuclear, Materials, Aeronautic, and Robotic.

I am currently enrolled at UNM-LA working on a degree in the applied sciences department.

Must be enrolled in at least 12 semester credit hours (or full-time equivalent). Entering freshmen must provide documentation indicating matriculation into a suitable undergraduate degree program.

I am a full time student at UNM-LA. My attached transcript will confirm my course load. I'm current take the following courses:

Must currently have and maintain a cumulative GPA of at least 3.0 on a 4.0 scale (or equivalent).

My GPA is 3.56/4.0

Demonstrated ability to communicate (verbal and written) well in a professional scientific context.

Have you written any reports for projects? Your resume and cover letter will convey these skills.

Eagerness and demonstrated record of working as a member of small teams to accomplish tasks safely and efficiently.

Describe a time you worked on a small team for a school project or extracurricular activity.

Experience designing and/or fabricating electronic, mechanical, or robotic systems.

Discuss and experience with fabricating electronic, mechanical, or robotic systems. Did you do this during a school class or club. Dedicate one paragraph for each you have done. Can discuss multiple projects.

Ability to read and understand electrical/mechanical schematics and drawings.

Write about when you had to read and understand electrical or mechanical schematics or drawings.

Desired Qualifications:

Computer programming in support of engineering design, data acquisition, analysis, robot control, or machine learning.

Describe your computer programming experience. Have you done computer programming with respect to engineering design, data acquisition, analysis, robot control, or machine learning. You can describe more than one project and discipline.

Interest in the areas of Programmable Logic Controller (PLC), Human Machine Interface (HMI) operation, and communication protocols.

What do you find interesting about these areas. Have you done any project that involve PLCs, HMIs, or communication protocols.

Basic knowledge of Computer Aided Design (CAD), AutoCAD Electrical.

Something about your CAD and AutoCAD Electrical knowledge

Basic knowledge of Computer Aided Design (CAD), AutoCAD Electrical.

Something about your CAD and AutoCAD Electrical knowledge

Design, assembly, and operation of mechanical systems.

Give examples of any projects involving design, assembly, and operation of mechanical systems.

Basic knowledge of electronic system construction techniques and the ability to fabricate, test, and document data acquisition and control systems electronic racks, chassis, and associated cabling.

Detail any electronic systems knowledge or experience.

Ability to troubleshoot and repair electrical and electronic equipment using common electronics bench instrumentation, such as Digital Multimeters (DMMs), and/or oscilloscopes.

Explicitly state what equipment you have used.

Ability to use standard shop tools such as soldering irons, crimpers, drills, punches, etc., and to provide basic mechanical assembly of equipment racks.

Explicitly state what tools you have used.

Laboratory or shop experience demonstrating an attention to detail and commitment to safety, security, and quality.

Give an example of laboratory or shop experience where safety, security, and quality came into play.

Commitment to achieving results in a complex social and organizational setting.

This could be a job, club, sports team, or volunteer organization.

Sincerely,

First Last

Resume

- One page front and back
- Tailor for specific job
  - Word choice and details
  - Experience to highlight
- Sections to Include:
  - Summary of qualifications and why you want this job
  - Education and relevant course work
  - Experience: Work, class projects, clubs, athletics, volunteer
    - Explain why these are relevant to this job
  - Awards
  - Skills: Computer skills, engineering skills, shop skills, interpersonal skills
- Most important/relevant first

Final Tips

- Save documents as PDF
  - Word/text documents are easily editable
- Be specific about why you should get the job
  - Give examples
  - What have you done thus far that makes you qualified
- Use the same language as the job ad
  - Reviewers search for those words to see how you meet that requirement/qualification
- Name your documents with your name
  - Example: Boardman_Resume.pdf, Boardman_CoverLetter.pdf, Boardman_Transcript
- Reduce white space while maintaining readability